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Indian Standard

SPECIFICATION FOR INK, CLOTH MARKING

(Second Revision)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR INK, CLOTH MARKING

(Second Revision)

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Indian Standard

SPECIFICATION FOR INK, CLOTH MARKING

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 4 March 1985, after the draft finalized by the Inks and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard was first issued in 1952. It was intended for slow developing inks only. It was revised in 1963 incorporating quick developing cloth marking ink. A method of test for resistance to dry cleaning solvents was also included. The Sectional Committee responsible for its preparation decided to revise it again to cover synthetic fabrics also. A test for drying time has also been included in this revision. The Committee appreciated that a simpler method of test is required to be evolved for test on tendering effect on fabrics to replace the existing one.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for cloth marking ink. The material is used for marking cotton, silk, synthetic fabrics and woollen cloth with pen or any other suitable instrument like metal stamp or stencil.

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*Rules for rounding off numerical values (*revised*).

2. TYPES

2.1 The cloth marking ink shall be of the following two types:

a) Slow developing, and

b) Quick developing.

3. REQUIREMENTS

3.1 For Slow Developing Ink

3.1.1 *Description* — The material shall be in the form of a solution.

3.1.2 *Flow* — The material shall flow freely from the pen and shall not spread when applied to cloth by the method recommended by the supplier.

3.1.3 *Development* — The marking made on cloth by the material, when exposed to air, shall darken in six hours, and shall be black or of the required colour after washing in water.

3.1.4 *Keeping Quality* — The material, when stored in original containers, shall continue to satisfy the requirements given under **3.1** for a minimum period of two years from the date of manufacture.

3.1.5 *Performance*

3.1.5.1 *Mark* — The outlines of the marking made by the material on cotton, silk, woollen or synthetic fabrics by means of a pen, metal stamp or stencil shall be clear and sharp.

3.1.5.2 *Resistance to bleaching and laundering* — When tested as prescribed in **A-2**, the marking made by the material shall be clear and legible and shall show no appreciable fading, 'running' or 'pinking'.

3.1.5.3 *Resistance to dry cleaning solvent* — When tested as prescribed in **A-3**, the marking shall remain clear and legible.

3.1.5.4 *Tendering effect on fabric* — When tested as prescribed in **A-4**, the breaking strength of the fabric treated with the material shall be approximately the same as that of the untreated fabric.

3.2 For Quick Developing Ink

3.2.1 *Description* — The material shall be in the form of a suitable solution or dispersion.

3.2.2 *Flow* — The material shall flow freely from the pen and shall not spread when applied to cloth by the method recommended by the manufacturer.

3.2.3 *Development* — Immediately after application, the marking made on cloth by the material shall be black or of the colour required.

3.2.4 *Keeping Quality* — The material, when stored in original containers, shall continue to satisfy the requirements given under **3.2** for a minimum period of two years from the date of manufacture.

3.2.5 *Performance*

3.2.5.1 *Mark* — When applied to a cotton, silk, woollen or synthetic fabric by means of a pen, metal stamp or stencil, the ink shall give a distinct marking with a sharply defined outline.

3.2.5.2 *Resistance to bleaching and laundering* — The marking as produced in **3.2.5.1**, when tested as prescribed in **A-2**, shall be clear and legible and shall show no appreciable signs of fading, 'running' or 'pinking'.

3.2.5.3 *Resistance to dry cleaning solvents* — When tested as prescribed in **A-3**, the marking shall remain clear and legible.

3.2.5.4 *Tendering effect on fabric* — When tested as prescribed in **A-4**, the breaking strength of the fabric treated with the material shall be approximately the same as that of the untreated fabric.

3.2.6 *Drying Time* — When tested as prescribed in **A-5**, there shall be no off-setting of the colour.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in bottles of 15-ml and 30-ml capacity or as agreed to between the purchaser and the supplier. The use of dwarf bottles is, however, recommended.

4.2 Marking — Each bottle shall be marked with the following information:

a) Description of the material;

b) Colour of marks produced;

c) Volume in ml of the material in the bottle;

d) Month and year of the packing;

e) Manufacturer's name and recognized trade-mark, if any; and

f) Identification in code or otherwise to enable the lot of manufacture to be traced back from records.

4.2.1 The bottles may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples of the material shall be prepared and adjudged as prescribed in Appendix B.

APPENDIX A

(*Clauses* 3.1 *and* 3.2)

TESTING OF INK, CLOTH MARKING

A-1. QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS: 1070-1977*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. TEST FOR RESISTANCE TO BLEACHING AND LAUNDERING

A-2.1 Reagents

A-2.1.1 *Sodium Hypochlorite Solution* — Containing 2 g of available chlorine per litre of the solution. Pass chlorine gas in a standard sodium hydroxide solution (4N) at 10°C. Stop the chlorination when 5 ml of the solution is equivalent to 35 ml of 0·1 N sodium thiosulphate solution. When required, dilute the hypochlorite solution so that one litre of the solution contains 2 g of available chlorine.

A-2.1.2 *Bleaching Powder Suspension* — Containing 2 g of available chlorine per litre, prepared when required. The use of the bleaching powder, stable (*see* IS: 1065-1975†) is recommended.

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*Specification for water for general laboratory use (*second revision*).

†Specification for bleaching powder, stable (*first revision*).

A-2.1.3 *Oxalic Acid Solution* — approximately 1·0 percent (*m*/*v*).

A-2.1.4 *Dilute Hydrochloric Acid* — approximately 1·0 percent (*v*/*v*). Determine the hydrogen chloride content of concentrated hydrochloric acid and dilute to obtain a concentration of approximately 1·0 percent (*v*/*v*). The use of hydrochloric acid, pure (*see* IS:265-1977*) is recommended. The hydrogen chloride of this material is 32 percent minimum by mass.

A-2.1.5 *Soap Solution* — containing 20 g of suitable, dry, laundry soap per litre of the solution. Laundry soap, Grade I (*see* IS:285-1974†) is recommended, the moisture content of the soap being taken into account in adjusting the concentration of the soap solution.

A-2.2 Procedure

A-2.2.1 Wash a sufficient number of pieces (10 × 10 cm) of cloth with hot soap solution to remove starchy matter, and then dry them. Mark the pieces with more or less identical marks or script with the material to be tested by means of a pen, metal stamp or stencil. Keep the marked strips in a dry place for 24 hours. At the end of this period, the marking shall be clear and legible and shall show no sign of colour 'running' out. There shall also be no 'pinking' after stacking between white materials at room temperature.

A-2.2.2 Take two pieces of cloth, marked as prescribed under **A-2.2.1**. Immerse one of the pieces for six hours in sodium hypochlorite solution or bleaching powder suspension. It shall be clear and legible after this treatment. There shall be no appreciable difference in the intensity of marking in the two pieces.

A-2.2.3 Take two pieces of cloth, marked as prescribed under **A-2.2.1** and wash one of the pieces successively with hot soap solution at 95 to 98°C, hot oxalic acid solution, dilute hydrochloric acid and finally with water, keeping for one hour in each solution. Rinse and dry the treated pieces and compare with the other untreated pieces. There shall be no appreciable difference in the intensity of marking in the two pieces. Further, the marks shall remain legible after being similarly washed five more times.

A-3. TEST FOR RESISTANCE TO DRY CLEANING SOLVENTS

A-3.1 Apparatus

A-3.1.1 *Wash Wheel* — The wash wheel as shown in Fig. 1 consists of a steel spider wheel carrying 12 stainless steel jars which may be quickly removed and opened up for filling. Each jar contains one test piece together with the appropriate test liquor. The wheel with jars attatched

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*Specification for hydrochloric acid (*second revision*).

†Specification for laundry soap (*second revision*).

rotates in a bath containing water heated to the desired temperature by electric immersion heaters and maintained at a constant temperature by a thermo-regulator. A cover is placed over the machine when in use, so that the whole of it is maintained at the same temperature.

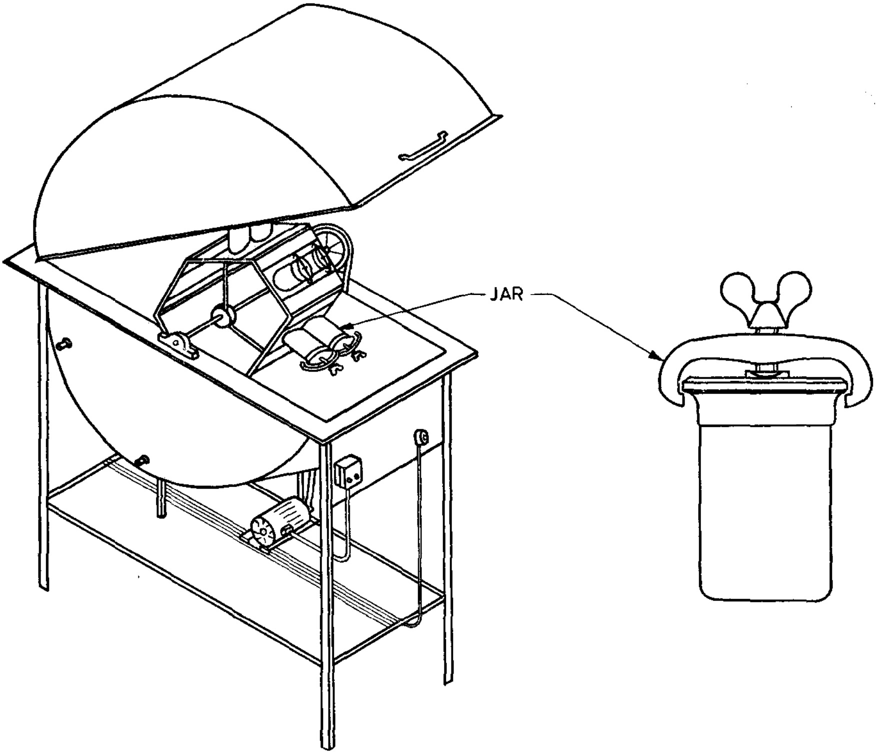

FIG. 1 WASH WHEEL

A-3.2 Reagents

A-3.2.1 *Petroleum Hydrocarbon Solvent 90/135* — petroleum hydrocarbon solvent (*see* IS : 1745-1978*) containing 0·5 percent of water and 4 percent by volume of petroleum sulphonate having 50 percent active material content.

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*Specification for petroleum hydrocarbon solvents (*second revision*).

A-3.2.2 *Trichloroethylene* — trichloroethylene (*see* IS:245-1970*) containing 0·5 percent water and 4 percent by volume of petroleum sulphonate having 50 percent active material content.

A-3.3 Procedure

A-3.3.1 *Test Specimen* — Wash a sufficient number of pieces of cloth with hot soap solution to remove starchy matter and dry them. Mark the pieces with ink by means of a pen or any other suitable means. Allow the marks to dry for 24 hours at room temperature.

A-3.3.2 Wash the test specimen in the wash wheel carrying stainless steel covered jar. Place petroleum hydrocarbon solvent about 50 times the mass of test specimen in the jar, together with ten Monel metal or stainless steel balls about 0·6 mm in diameter. Then place the test specimen in the jar and fix the jar in the wash wheel. Rotate the jar at 40 rev/min and run for 30 minutes. Remove the test specimen from the jar and allow to dry.

A-3.3.2.1 Repeat the above test, using trichloroethylene in place of petroleum hydrocarbon solvent.

A-3.3.3 Compare the mark on the treated piece with the mark on the untreated piece. There shall be no appreciable difference in the intensity of marking in the two pieces.

A-4. TEST FOR TENDERING EFFECT ON FABRICS

A-4.0 Method — Ten strips of cotton or silk or woollen or synthetic fabric are treated with the marking ink, conditioned and tested for breaking strength in a suitable strength testing machine along with ten similar control strips, similarly conditioned but not treated with the marking ink.

A-4.1 Apparatus — A constant-rate-of-traverse strength testing machine of the type prescribed under **6.1** of IS: 1969-1968† shall be used.

A-4.2 Preparation of Strip — Cut ten pieces from a cotton or silk or woollen or synthetic fabric, each 50 mm wide and of such a length as to allow a gap of 200 mm between the grips of the cloth testing machine. Cut each such piece breathwise into two equal strips. Use one strip from each piece, ten in all for the tendering test and the other ten strips as control.

A-4.3 Procedure — Saturate with the material one centimetre portion of each of the ten strips as prepared under **A-4.2** and allow to stand for

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*Specification for trichloroethylene, technical (*second revision*).

†Method for determination of breaking load and elongation at break of woven textile fabrics (*first revision*).

12 hours at ordinary temperature. Test these strips (*see* **A-4.3.1**) and the control strips for breaking strength as prescribed under **9** of IS: 1969-1968* and compare the results.

A-4.3.1 The material shall be taken to have passed the test in the following requirements are satisfied:

a) After bleaching as prescribed under **A-2.2.2** and drying, the average breaking strength of strips treated with the material, shall be the same as that of the control strips, that is, the strips which have not been treated with the material but have been bleached and dried in the same manner as the treated strips.

b) After treating as prescribed under **A-2.2.2** and drying, the average breaking strength of strips on the saturated portion shall be the same as that of the control strips.

c) After exposing to a temperature of 70°C for 48 hours and then conditioning at a temperature of 27±1°C and a relative humidity of 65±2 percent for four hours, the average breaking strength of the strips treated with the material, shall be the same as that of control strips.

d) After exposing to a temperature of 70°C for four hours and treating as prescribed under **A-2.2.3**, the average breaking strength of the strips saturated with the material shall be the same as that of the control strips.

A-5. TEST FOR DRYING TIME

A-5.1 Procedure — Mark a piece of the fabric with three parallel straight lines 5 cm long, 6 mm wide and 12 mm apart. Allow it to dry at room temperature for one hour and then place it on a hard, flat surface and cover the marked area with a second piece of the same fabric about 10 cm square. Cover the second piece of the fabric with a metal plate 7·5 cm square and suitable weight so that the two pieces of test fabric bear a pressure of 3 kg over an area of 7·5 cm square which includes the marked area.

A-5.1.1 Allow the assembly to stand for five minutes, then pull the second piece of test fabric from under the weight so that its face slides over that of the mark fabric still under pressure.

A-5.2 The ink shall satisfy the requirement of the test if there is no off-set of the colour over the second piece.

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*Method for determination of breaking load and elongation at break of woven textile fabrics (*first revision*).

APPENDIX B

(*Clause* 5.1)

SAMPLING OF INK, CLOTH MARKING

B-1. GENERAL REQUIREMENTS OF SAMPLING

B-1.0 In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

B-1.1 Samples shall not be taken in an exposed place.

B-1.2 The sampling instrument shall be clean and dry when used.

B-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples, from adventitious contamination.

B-1.4 To draw a representative sample, the contents of each bottle selected for sampling shall be thoroughly mixed.

B-1.5 The samples shall be filled in clean, dry, air-tight glass containers on which the material has no action.

B-1.6 The sample containers shall be of such a size that they are almost completely filled by the sample.

B-1.7 Each sample container shall be sealed air-tight with a stopper after filling, and marked with full particulars of the material as given in **4.2** and the date of sampling.

B-1.8 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the bottles of the same size in a single consignment containing ink of one type and from the same batch of manufacture shall constitute a lot.

B-2.1.1 Samples shall be tested from each lot for ascertaining the conformity of the material to the requirements of the specification.

B-2.2 The number (n) of bottles to be chosen from a lot, shall depend on the size of the lot and shall be in accordance with Table 1.

TABLE 1 NUMBER OF BOTTLES TO BE SELECTED FOR SAMPLING

LOT SIZE	NO. OF BOTTLES TO BE SELECTED
N	n
Up to 15	2
16 „ 50	3
51 „ 150	5
151 and above	8

B-2.3 These bottles shall be chosen at random from the lot and to ensure randomness of selection, random number tables (*see* IS:4905-1968*) shall be used. In case such tables are not available, following procedure may be adopted.

B-2.3.1 Starting from any bottle count them as 1, 2, 3, etc……… up to r and so on, in one order. Every rth bottle thus counted shall be withdrawn to give a sample for test, where r is the integral part of N/n (N being the lot size and n the number of bottles to be chosen from the lot).

B-3. TEST SAMPLES AND REFEREE SAMPLES

B-3.1 Before drawing the samples, the material in the bottles chosen (*see* **B-2.2**), shall be thoroughly mixed by shaking or stirring or rolling. Samples shall then be drawn with the help of a suitable sampling instrument.

B-3.2 From each of the bottles three test samples shall be drawn the volume of each sample being sufficient to conduct all the tests specified in **3.1** or **3.2**, as the case may be. All the test samples thus obtained shall be transferred to sample containers (*see* **B-1.5**) and marked with all the details of sampling (*see* **B-1.7**). These samples shall then be separated into three identical sets of test samples in such a way that each set has a test sample representing each bottle selected (*see* **B-2.2**). One of these three sets shall be of the purchaser, another for the supplier, and the third for the referee.

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*Methods for random sampling.

B-3.3 Referee Sample — Referee sample shall consist of the set of test samples (*see* **B-3.2**) marked for this purpose and shall bear the seals of both the purchaser and the supplier and shall be kept at a place agreed to between the two.

B-4. NUMBER OF TESTS

B-4.1 Test for all the requirements of the specification given in **3.1** or **3.2** as the case may be, shall be conducted on each of the samples in a set.

B-5. CRITERIA FOR CONFORMITY

B-5.1 A lot shall be declared as conforming to the requirements of the specification if each of the test result satisfies all the relevant requirements of the specification individually.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg. m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2